

WHAT IS CLAIMED IS:

1. An optical multi-beam scanning device,  
comprising:

5 a plurality of light sources;  
deflecting means for deflecting light beams from the  
light sources;

post-deflection optical means for making the light beams  
deflected by the deflecting means enter a surface to be scanned  
10 in a vertical scanning direction with respect to a normal  
direction of the surface to be scanned at a predetermined  
angle;

horizontal synchronization detecting means for  
synchronizing the light beams in a horizontal scanning  
15 direction; and

optical path folding means for folding the light  
beams, directing towards the surface to be scanned, to the  
horizontal synchronization detecting means,

wherein when the light beams are assumed to reach the  
20 surface to be scanned with the light beams not being folded  
by the optical path folding means, a light receiving surface  
of the horizontal synchronization detecting means is tilted  
so as to output a horizontal synchronized signal when the  
light beams come to the same position on the surface to be  
25 scanned in the horizontal scanning direction.

2. The optical multi-beam scanning device according  
to claim 1, wherein the light receiving surface of the

horizontal synchronization detecting means is tilted in the vertical scanning direction at an angle equivalent to that of the surface to be scanned.

5           3.     The optical multi-beam scanning device according to claim 1, wherein when a tilting direction of the light receiving surface of the horizontal synchronization detecting means is assumed to be in a plane formed in the vertical scanning direction and the horizontal scanning direction, and the light  
10   beams are assumed to reach the surface to be scanned with the light beams not being folded by the optical path folding means, the tilting angle is a direction such that the horizontal synchronized signal is output when the light beams are on the same position on the surface to be scanned in the horizontal  
15   scanning direction.

          4.     The optical multi-beam scanning device according to claim 1, wherein a tilting angle of the light receiving surface of the horizontal synchronization detecting means  
20   includes the horizontal scanning direction, the vertical scanning direction, and a direction perpendicular to the horizontal scanning direction and the vertical scanning direction.

25           5.     The optical multi-beam scanning device according to claim 1, wherein  
          a relationship among wavelengths of the light beams from the light sources is set so that their moving amounts

in the horizontal scanning direction with respect to a deflecting angle are uniform,

an optical element for changing an emitting angle according to a fluctuation in the wavelengths of the light beams emitted from the light sources is arranged on an optical path between the deflecting means and the horizontal synchronization detecting means.

6. An optical multi-beam scanning device,  
comprising:

a plurality of light sources;

deflecting means for deflecting light beams from the light sources;

post-deflection optical means for making the light beams deflected by the deflecting means enter a surface to be scanned in a vertical scanning direction with respect to a normal direction of the surface to be scanned at a predetermined angle;

horizontal synchronization detecting means for synchronizing the light beams in a horizontal scanning direction;

optical path folding means for folding the light beams, directing towards the surface to be scanned, to the horizontal synchronization detecting means; and

a light shielding member having a tilt such that when the light beams are assumed to reach the surface to be scanned with the light beams not being folded by the optical path folding means, the light beams are emitted to a light receiving

surface of the horizontal synchronization detecting means with a uniform rate when the light beams come to the same position on the surface to be scanned.

5           7.     The optical multi-beam scanning device according to claim 6, wherein the light shielding member is provided so that when the light beams come to the same position on the surface to be scanned in the horizontal scanning direction, the light beams come to a boundary between a light shielding  
10     portion and a non-light shielding portion.

          8.     The optical multi-beam scanning device according to claim 6, wherein the light shielding member is integral with a housing for holding the post-deflection optical means.

15           9.     The optical multi-beam scanning device according to claim 6, wherein

          a relationship among the wavelengths of the light beams from the light sources is set so that moving amounts in the  
20     horizontal scanning direction with respect to a deflecting angle are uniform, and

          an optical element for changing an emitting angle according to a fluctuation in wavelengths of the light beams emitted from the light sources is arranged on an optical path  
25     between the deflecting means and the horizontal synchronization detecting means.

          10.    An optical multi-beam scanning device,

comprising:

a plurality of light sources;

deflecting means for deflecting light beams from the light sources;

5 post-deflection optical means for making the light beams deflected by the deflecting means enter a surface to be scanned in a vertical scanning direction with respect to a normal direction of the surface to be scanned at a predetermined angle;

10 horizontal synchronization detecting means for synchronizing the light beams in a horizontal scanning direction; and

optical path folding means for folding the light beams, directing towards the surface to be scanned, to the horizontal  
15 synchronization detecting means;

wherein an optical element for changing an emitting angle according to a fluctuation in the wavelengths of the light beams emitted from the light sources is arranged on an optical path between the deflecting means and the horizontal  
20 synchronization detecting means.

11. The optical multi-beam scanning device according to claim 10, wherein the optical element for changing the emitting angle according to the fluctuation in the wavelengths  
25 of the light beams has a wavelength characteristic such that positions of the light beams on the horizontal synchronization detecting means do not change even when the wavelengths change.

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12. An optical multi-beam scanning device,  
comprising:

a plurality of light sources;

deflecting means for deflecting light beams from the  
5 light sources;

post-deflection optical means for making the light beams  
deflected by the deflecting means enter a surface to be scanned  
in a vertical scanning direction with respect to a normal  
direction of the surface to be scanned at a predetermined  
10 angle;

horizontal synchronization detecting means for  
synchronizing the light beams in a horizontal scanning  
direction; and

optical path folding means for folding the light beams,  
15 directing towards the surface to be scanned, to the horizontal  
synchronization detecting means;

wherein the optical path folding means changes an  
emitting angle according to a fluctuation in wavelengths of  
the light beams emitted from the light sources.

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13. The optical multi-beam scanning device according  
to claim 12, wherein the optical path folding means has a  
wavelength characteristic such that positions of the light  
beams on the horizontal synchronization detecting means do  
25 not change even when the wavelengths change.

14. An image forming apparatus, comprising:

the optical multi-beam scanning device according to

claim 1; and

a photoreceptor having a surface to be scanned on which latent images are formed based on light beams from the optical multi-beam scanning device.

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15. An image forming apparatus, comprising:

the optical multi-beam scanning device according to claim 6; and

a photoreceptor having a surface to be scanned on which latent images are formed based on light beams from the optical multi-beam scanning device.

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16. An image forming apparatus, comprising:

the optical multi-beam scanning device according to claim 10; and

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a photoreceptor having a surface to be scanned on which latent images are formed based on light beams from the optical multi-beam scanning device.

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17. An image forming apparatus, comprising:

the optical multi-beam scanning device according to claim 12; and

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a photoreceptor having a surface to be scanned on which latent images are formed based on light beams from the optical multi-beam scanning device.